



BUILDING INDIA'S COLD CHAIN INFRASTRUCTURE

Establishing Linkages between U.S. & Indian Firms



AGENDA

Time	Session/Activity Description	Lead Presenter(s)
DAY-01		
09:00 – 09:30 AM	Registration	IARW/WFLO-India
09:30 – 10:15 AM	Introduction to the Cold Chain Workshops ? Welcoming presentations/greetings ? Inaugural Address ? Why is an integrated cold chain so important for India?	USTDA Mr. Henry V. Jardine, Consul General, U.S. Consulate General, Kolkata* (*To be confirmed) IARW/WFLO-HQ
10:15 – 11:00 AM	Module 1: Postharvest Technology for Handling Fresh Fruits and Vegetables ? M1.01 Overview of basic postharvest handling practices from harvest to the consumer	Dr. Adel A. Kader
11:00 – 11:15 AM	Tea/Coffee Break	
11:15 – 12:00 Noon	Module 2: Microbiology and Bio-technology and the Cold Chain ? M2.03 Microbes associated with foods and organic materials—contamination problems, microbial growth on and in foods, food spoilage issues	Dr. Sunil Saran
12:00 – 01:00 PM	Module 3: Food Safety Issues and Practices ? M3.01 Overview of Food Safety Issues and the Cold Chain ? M3.02 Food safety hazards—physical, chemical and biological	Mr. Amit Sachdev
01:00 – 02:00 PM	Lunch	
02:00 – 03:00 PM	Module 4: Refrigeration and Cold Storage Practices ? M4.01 Refrigeration, relative humidity and vapor pressure; Thermal characteristics of cold storage structures	Mr. Ron Vallort
03:00 – 04:00 PM	Module 4: Refrigeration and Cold Storage Practices ? M4.06 A Model Integrated Cold Chain Facility for India	Mr. Gurmit Singh
04:00 - 04:15 PM	Tea/Coffee Break	
04:15 – 05:15 PM	Module 5: Cold Chain Management for the Foods & Fresh Produce Industries ? M5.01 Overview of the Management of Cold Storage Facilities	Mr. Doug Weathers
DAY-02		
09:00 – 09:30 AM	Registration	IARW/WFLO-India
Session 01	Postharvest Handling, Food Safety, Microbiology & the Cold Chain (Concurrent Session with Modules 4 & 5)	
09:30-10:00 AM	Module 1: Postharvest Technology for Handling Fresh Fruits and Vegetables ? M1.02 The relationship between Maturity and Quality, use of Maturity Indices	Dr. Adel Kader
10:00-10:30 AM	? M1.03 Sorting and grading -- effects on postharvest shelf life ? M1.04 Curing practices used to extend postharvest life--onions and garlic, potatoes ? M1.05 Packing practices and packaging materials-- effects on postharvest shelf life	Dr. Lisa Kitinoja
10:30-11:15 AM	? M1.06 Respiration rate of fruits and vegetables – temperature effects and senescence ? M1.07 Efficient pre-cooling methods and relative humidity control ? M1.08 Transportation—cold trucks versus open loads	Dr. Adel Kader
All Day	Module 1 Demonstrations/Displays: ? Tools for measuring maturity indices ? Packages designed for protection and proper pre-cooling	On display during the day in the conference room, to be discussed as part of the various Module 1 sessions.
11:15 – 11:30 AM	Tea/Coffee Break	
11:30-12:30 PM	Module 1: Postharvest Technology for Handling Fresh Fruits and Vegetables ? M1.09 Postharvest disease management—methods and concerns ? M1.10 Problems & disorders of fresh produce in cold storage—wilting & water loss, chilling injury, odors & ethylene damage due to mixed loads, pests & decay	Dr. Adel Kader Dr. Farbod Youssefi
12:30 - 01:30 PM	Lunch	At the hotel venue
01:30 – 02:30 PM	Module 2: Microbiology and Bio-technology and the Cold Chain ? M2.01 Overview of basic food science principles and food constituents	

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Time	Session/Activity Description	Lead Presenter(s)
	? M2.02 Classifications of foods according to pH and ease of spoilage ? M2.04 Effects of low temperature on microbial growth	Dr. Farbod Youssefi Dr. Sunil Saran
All Day	Module 2 Demonstrations/Displays: ? Posters, illustrations and/or live cultures showing microbial growth on selected food products ? Methods for calculation of microbial loads (counts) on selected products after selected periods of time at 0°, 10°, and 20° C.	On display during the morning in the conference room, to be discussed as part of the various Module 2 sessions.
02:30 -03:00 PM	Module 3: Food Safety Issues and Practices ? M3.03 Food borne diseases—low temperature food pathogens	Dr. Sunil Saran
03:00 – 03:15 PM	Coffee/ Tea break	
03:15-03:45 PM	Modules 2 and 3 Working Group Exercise: ? Assessing the presence of gram negative bacteria on fresh produce and food products (Quick Alert Method) ? Question and Answer Session	Dr. Farbod Youssefi Dr. Sunil Saran
03:45- 04:45 PM	Module 3: Food Safety Issues and Practices ? M3.04 Good Agricultural Practices (GAP) ? M3.05 Good Manufacturing Practices (GMP) and HACCP for low temperature food storage ? M3.06 Looking to the future: Global markets and food safety issues	Dr. Farbod Youssefi Mr. Amit Sachdev
04:45 -05:15 PM	Module 3 Working Group Exercise: ? Practice performing a simplified GAP or GMP self-audit ? Question and Answer Session	Dr. Farbod Youssefi Mr. Amit Sachdev
All Day	Module 3 Demonstrations/Displays: ? Tools and illustrations used for monitoring and measuring factors related to food safety.	On display during the afternoon in the conference room, to be discussed as part of the various Module 3 sessions.
09:00 - 09:30 AM	Registration	IARW/WFLO-India
Session 2	Refrigeration and Cold Storage (Concurrent Session with Modules 1, 2 & 3)	
09:30-10:45 AM	Module 4: Refrigeration and Cold Storage Practices ? M4.02 Selection of appropriate refrigeration/freezing units (BTU and refrigerants); Measuring and monitoring temperatures in the cold store; Minimizing temperature fluctuations	Mr. Ron Vallort
01:45-11:00 AM	Tea/Coffee Break	
11:00 – 12:00 Noon	? M4.03 Efficient methods for pre-cooling and cold storage—comparisons of room cooling, forced air cooling, use of ambient or modified atmospheres, high relative humidity.	Dr. Lisa Kitinoja
12:00 – 12:30 PM	? M4.04 Storage conditions recommended for selected commodities—tropical/sub-tropical fruits and vegetables, temperate fruits/vegetables,	Dr. Lisa Kitinoja
12:30 – 01:30 PM	Lunch	
01:30 – 02:00 PM	? M4.05 Storage considerations-- special considerations for apples, grapes, potatoes, onions, edible nuts	Dr. Adel Kader
All Day	Module 4 Demonstrations/Displays: ? Temperature compatibility charts ? Temperature measuring tools and devices (handheld digital probe, automated monitoring systems)	On display during the day in the conference room, to be discussed as part of the various Module 4 sessions
02:00 – 02:30 PM	Module 5: Cold Chain Management for the Foods & Fresh Produce Industries ? M5.02 Separation of pre-cooling and cold storage functions within the cold store ? M5.03 Pallet layout and stacking options—benefits of standardization of palletization	Mr. Doug Weathers
02:30 – 03:00 PM	Question and Answer Session	
03:00 – 03:15 PM	Coffee/Tea Break	
03:15 – 04:15 PM	? M5.04 Flexible storage systems and racking options—direct access versus mass storage	Mr. Doug Weathers

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Time	Session/Activity Description	Lead Presenter(s)
	? M5.05 Produce and temperature traceability ? M5.06 Risk management issues and methods	
All Day	Module 5 Demonstrations/Displays: ? Temperature recording devices used during transport ? Documentation worksheets for traceability.	On display during the day in the conference room, to be discussed as part of the various Module 5 sessions.
04:15 – 05:00 PM	Cold Chain Problem Diagnosis: ? Identifying the causes and sources of postharvest losses and quality problems	Dr. Adel Kader
DAY-03		
09:00 – 09:30 AM	Registration	IARW/World Food Logistics Organization-India
09:30 – 10:15 AM	Module 4: Refrigeration and Cold Storage ? Review of Key Concepts and Practices	Mr. Ron Vallort
10:15 – 11:00 AM	Module 5: Cold Chain Management for the Foods & Fresh Produce Industries ? M5.07 Speed versus Safety—worker safety issues ? M5.08 Truck versus railroad transport—feasibility, convenience, costs/benefits ? M5.09 Management of transport vehicles and loads —fast-loading devices, air distribution/air renewal rates, cleaning and maintenance of vehicles and equipment.	Mr. Doug Weathers
11:00 -11:15 AM	Coffee/Tea Break	
11:15 – 11:45 AM	? M5.10 Insulation of docks—costs and benefits ? M5.11 Multi-compartment and multi-temperature vehicles	Mr. Doug Weathers
11:45 – 12:00 Noon	DVD presentation: ? Loading makes a difference	UC PTRIC
12:00- 12:30 PM	Module 1: Postharvest Technology for Handling Fresh Fruits and Vegetables ? M1.11 Retail packaging and display methods-- effects on postharvest shelf life	Dr. Lisa Kitinoja
12:30 – 01:30 PM	Lunch	At the hotel venue
01:30 – 02:00 PM	Module 1: Postharvest Technology for Handling Fresh Fruits and Vegetables ? M1.12 Concerns of importers/exporters sending fresh produce to India ? M1.13 Issues for exporters sending fresh produce from India to global markets	Dr. Lisa Kitinoja
All Day	Module 1 Demonstrations/Displays: ? Tools for measuring maturity indices ? Packages designed for protection and proper pre-cooling ? Effects of temperature (0°, 10°, and 20° C storage for 1 week) on postharvest life (visual appearance, overall quality characteristics, decay rates, market value)	On display during the day in the conference room, to be discussed as part of the various Module 1 sessions.
02:00 – 02:45 PM	Module 4 Working Group Exercises: ? Practice the calculation of refrigeration and freezing loads for various products, storage rooms and temperature zones ? Practice the calculation of times required for pre-cooling selected commodities using forced air cooling, given varying initial and desired temperatures	Mr. Ron Vallort Mr. Doug Weathers
02:45 – 03:00 PM	Coffee/Tea Break	
03:00 – 03:15 PM	Training materials CD Demo	Dr. Lisa Kitinoja
03:15 – 04:00 PM	Module 1 Working Group Exercises: ? Calculation of potential storage life for selected commodities based upon various cold storage and ambient temperatures and the associated respiration rates	Dr. Lisa Kitinoja Dr. Adel A. Kader
04:00 – 05:00 PM	Working Group Exercises: ? Cost/Benefit Worksheets related to all 5 Modules ? Calculation of the costs and benefits associated with a change in selected postharvest handling practices. ? Question and Answer Session ? Program Evaluation	All instructors

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